

Article #1454 -

## **REScheck Webcast Questions - Appliances**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

REScheck does not have the option for entering appliances. If you are installing a system that is not handled in REScheck, you should do three things to help your code official.

1. Make a note in the Project folder that gives your mechanical system and/or appliances specifics.
2. Attach documents to your REScheck compliance report that provide information about equipment type, efficiency, installation, and sizing.
3. Meet the appropriate requirements for the mechanical code in your area.

The following link offers additional information on this subject:

[What Should I Do if my Mechanical Equipment is Not an Option in the REScheck Software?](#)

### **The IRC code now requires combustion air openings, high and low in areas of appliance, including attics. How does this apply to REScheck?**

REScheck does not show compliance to the IRC. REScheck can be used to show compliance to the IECC for the exterior building envelope that separates conditioned from unconditioned spaces. Therefore, the inside walls of a room with combustion appliances that are vented to the exterior must be insulated to the exterior wall requirements.

Last Modified: 2005-07-14

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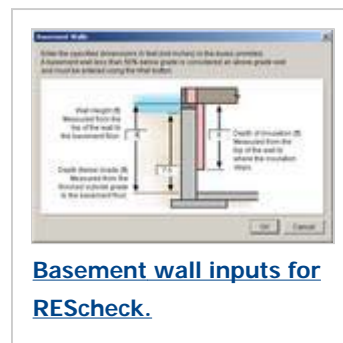
Article #1457 -

## REScheck Webcast Questions - Basement

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### When do you ignore the edge of a basement slab with a footing 12 inches or more below grade?

For slabs with a top edge above finished grade or 12 inches or less below finished grade, the IRC requires the insulation R-value to be applied to the outside of the foundation or the inside of the foundation wall (the required R-value of insulation is dependent upon location of the project based on heating degree days). The insulation shall extend downward from the top of the slab, or downward to the bottom of the slab and then horizontally in either direction, up to a minimum distance of 4 feet (total depth of insulation is dependent upon location).



Therefore, a slab that is greater than 12" below grade would not need to be entered in REScheck and would not be required to meet slab insulation requirements.

The following links offer additional information on this subject:

- [Why is Perimeter Slab Insulation Important?](#)
- [Where and How Should Perimeter Slab Insulation be Applied?](#)

### What do you recommend for basement slab calculations with or without heated floor?

To calculate foundation heat losses, heat loss values for slabs were taken from Huang et al. (1988). In this methodology, the heat loss unit for below-grade foundations is in terms of linear feet of perimeter (F-factor) instead of square feet of surface area (Uo-factor). A Uo-factor is multiplied by a surface area and degree-days to obtain the total heat loss. An F-factor is multiplied by a perimeter length and degree-days to obtain the total heat loss. These F-factors are shown in Table A.34. The F-factors are given in the referenced paper for insulation both on the exterior and interior of the foundation wall. The F factors vary only slightly by insulation placement, so the average of the exterior and interior insulation placement was used. The same F-factors were used for heated and unheated slabs. Huang et al. (1988) did not present F-factors for insulation levels above R-10 for slab insulation 2-ft deep; therefore, F-factors were considered to be constant for insulation levels above R-10 for this configuration. Additionally, F factors were considered to be constant for all insulation levels above R-20, regardless of insulation depth. This assumption was deemed reasonable because little is gained by the additional insulation (above R-20, most of the heat loss occurs under and around the insulation).

In the REScheck software, slab perimeters can be insulated to any depth up to 4 ft. To calculate heat loss for any combination of insulation depth and R-value, quadratic curves were fit through the data in Table A.34. The

resulting quadratic Equation (A.24) gives the F-factor as a function of insulation depth. The applicable coefficients for Equation (A.24) are given in Table A.35 and are determined by the insulation R-value. R-values range from R-0 to R-20.

**Table A.34:**

Slab-On-Grade Floor F-Factors

Insulation R-Value	2-ft Insulation Depth	4-ft Insulation Depth
R-0	1.043	1.041
R-5	0.804	0.744
R-10	0.767	0.684
R-15	0.767	0.654
R-20 and Above	0.767	0.636

**Slab F-Factor Equation (A.24):**

F-factor = intercept + coef 1 x depth + coef 2 x depth<sup>2</sup>

where depth = the distance the insulation extends downward (or downward and outward) in feet.

**Table A.35:**

Coefficients for Slab F-Factor Equation

R-Value	intercept	coef 1	coef 2
R-0	1.042	0.0013	-0.0004
R-1	1.042	-0.0967	0.0144
R-2	1.042	-0.1293	0.0188
R-3	1.042	-0.1459	0.0207
R-4	1.042	-0.1562	0.0217
R-5	1.042	-0.1635	0.0223
R-6	1.042	-0.1692	0.0227
R-7	1.042	-0.1739	0.0230
R-8	1.042	-0.1781	0.0233
R-9	1.042	-0.1819	0.0236
R-10	1.042	-0.1855	0.0240
R-11	1.042	-0.1836	0.0231

R-12	1.042	-0.1819	0.0222
R-13	1.042	-0.1805	0.0215
R-14	1.042	-0.1792	0.0208
R-15	1.042	-0.1780	0.0203
R-16	1.042	-0.1770	0.0197
R-17	1.042	-0.1760	0.0193
R-18	1.042	-0.1751	0.0188
R-19	1.042	-0.1743	0.0184
R-20	1.042	-0.1735	0.0180

## How should I enter basement walls that have rigid exterior insulation that is from grade down, not from top of wall down?

Separate the wall into two different assemblies, the wall with no insulation and the part of the wall that has insulation. If the top part of the wall that has no insulation is >50% above grade, it would be considered an above grade wall and should be entered as an above grade wall. The insulated portion of the wall, if >50% below grade, would be entered as a basement wall.

The following link offers additional information on this subject:

[How do I Enter Insulated Basement Walls in REScheck?](#)

## How would you enter a basement wall with outside rigid insulation that stops at grade?

When entering the depth of insulation for the basement wall, enter the depth in feet from the top plate to the grade level. Enter the insulation R-value in the Continuous Insulation column.

## If I use continuous rigid insulation on the inside of the basement, do I enter this as cavity or continuous?

You would enter your insulation R-value as continuous.

Cavity insulation is insulation installed in the cavities between structural members, such as wood studs, metal framing, and Z-clips. Continuous insulation runs continuously over structural members and is typically rigid foam board. Cavity insulation is affected by thermal bridging, while continuous insulation reduces thermal bridges.

### Continuous Insulation (CI)

Insulation that runs continuously over structural members and is free of significant thermal bridging; such as rigid foam insulation above the ceiling deck. It is installed on the interior, exterior, or is integral to any opaque surface of the building envelope.

The following link offers additional information on this subject:

[How Do I Enter Cavity and Continuous Insulation for Basement Walls in REScheck?](#)

## **Is rigid insulation on an interior basement wall (cmu) between furring considered continuous?**

No, if the basement wall is being furred out, insulation installed between the furring would be considered cavity insulation.

Cavity insulation is insulation installed in the cavities between structural members, such as wood studs, metal framing, and Z-clips. Continuous insulation runs continuously over structural members and is typically rigid foam board. Cavity insulation is affected by thermal bridging, while continuous insulation reduces thermal bridges.

Insulation to be installed between furring or studs is entered in the Cavity R-value column. If the installed wall insulation will be continuous (such as with exterior rigid insulation or interior "draped" insulation), the insulation R-value is entered in the Continuous R-value column. A combination of insulation systems may be used. For example, installing R-13 batt insulation between the studs and R-5 rigid insulation on the exterior of the stud wall.

## **Is it possible for a contractor to show compliance without final grade shown on drawings?**

No, one good example is a walk out basement. The code defines below grade walls as walls that are more than 50% below grade. If you don't know the final grade, then the best approach would be to assume the entire project is above grade or at grade level.

The following link offers additional information on this subject:

[How Do I Enter Non-Uniformly Insulated Basement Walls in REScheck?](#)

## **How do I calculate the depth below grade for a wall with difficult topography and before the lot is graded?**

The code defines below grade walls as walls that are more than 50% below grade. If you don't know the final grade, then the best approach would be to assume the entire project is above grade or at grade level.

## **Can below grade insulation depth be used as a tradeoff?**

In certain situations, because REScheck is heavily based on U factor x Area (UA, the heat loss/gain rate) calculations for each building assembly to determine the whole-building UA for the building design. The whole-building UA from a building conforming to the code requirements (the code building) is compared against the UA from the user's building design (the proposed building). If the total heat loss (represented as a UA) through the envelope of the user's building design does not exceed the total heat loss from the building conforming to the code, then the user's design passes.

## **Why do you get penalized when the depth of wall below grade is deeper into the ground? Isn't that opposite than it should be?**

The REScheck UA calculations for basement walls take into account the effect of the soil surrounding the below grade walls. The larger the depth (feet) below grade the overall UA calculation is less than a below grade wall

with a lesser depth (feet) below grade. The calculation takes into account the heat loss and the R-value of the soil according to the depth below grade.

## **How do you treat interior blanket insulation applied directly to foundation walls without studding?**

The insulation would be considered continuous insulation with no thermal breaks, enter in the Continuous Insulation column.

## **Do you list a floor on every project? I am not sure what should be input for a basement floor.**

If your basement is a walkout, you would enter the floor, at the walk out area, as slab on grade and your calculation would be the exposed portion of the slab in linear feet. The rest of the basement is entered as basement wall and not floor.

Floor components that are required to meet code are floors over unconditioned spaces and slabs on grade where the perimeter edge is exposed.

## **Is blanket insulation allowed for foundation walls?**

Yes, blanket insulation is allowed for foundation walls, but not for use as slab insulation. You may want to consider moisture when you plan for basement insulation.

## **Is fire safe batt insulation that is on the entire interior face of the basement wall considered continuous insulation?**

If the interior side of the basement wall is not furred out and you are draping the insulation from the top of the stem wall downward, the insulation would be considered continuous insulation. Keep in mind, the rim joist will still need to be insulated and the draped insulation is typically attached to the mud sill.

Article #1462 -

## **REScheck Webcast Questions - Building Envelope**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### **How do you treat an unconditioned room that is optionally insulated?**

A space that is considered unconditioned (not heated or cooled) would not be required to meet energy code requirements and the space would not be included as part of the building envelope for compliance, regardless of whether the space is optionally insulated.

The following link offers additional information on this subject:

[What is the Building Envelope?](#)

### **Are spaces over garage areas considered conditioned areas? What about carports?**

If you have a room above a garage that is conditioned, the garage ceiling would be considered part of the conditioned building envelope (floor over unconditioned space) and would need to be insulated and sealed according to code.

Occupied living space over a carport would be required to meet the applicable energy code requirements for a conditioned space. The floor of the living space over the carport would be defined as a floor over outside air.

### **In Texas Gulf Coast areas, recent research indicates that it is not recommended to install a vapor retarder on the warm-in-winter side of non-vented framed ceilings, walls, and floors. Does REScheck recognize this regional difference?**

REScheck will generate an Inspection Checklist based on the code selected, location, building envelope components, and mechanical information entered into the program. Vapor retarders will be listed on the Inspection Checklist if the code and project location are within areas that require vapor retarders. The energy code does have exceptions to installing vapor retarders where in construction moisture or its freezing will not damage the materials, where the county in which the building is being constructed is considered a hot and humid climate and identified as such in the climate zone maps, and where other approved means to avoid condensation in unventilated framed wall, floor, roof and ceiling cavities are provided.

The following link offers additional information on this subject:

[The Importance of Vapor Retarders](#)

## How do we do the take off of the two family house that is three stories in height and has two furnaces and two air conditioners?

Enter the entire exterior building envelope that would include both family dwelling units. Interior walls and floors that are between two conditioned spaces would not be included in your take offs.

For the HVAC systems, enter each unit separately in *REScheck*. However, if the efficiency of the units is above the minimum efficiencies in the code, *REScheck* will only give credit for the lower efficient unit shown.

## How do you find infiltration if the house is not square? Do you just add the total feet of the walls?

Typically, a blower door test is performed to determine the rate of infiltration (air changes per hour). The code has language that defines a workman like installation of sealing measures for penetrations, voids, gaps in the building envelope.

## Are multifamily projects (town homes) to be calculated as an overall building or can it be done by individual unit?

Compliance can be calculated either way (as an entire project or individual units). However, showing compliance by each individual unit can be more stringent and time consuming. The complexity is due to the fact that common walls between units cannot be shown as part of the building envelope. Common walls between two conditioned spaces would be considered an interior wall. Therefore, calculating compliance for the overall exterior building envelope would be a simpler approach to meeting code compliance.

## How do I enter a basement floor?

For walk out basements, the exposed portion of the slab should be entered in *REScheck* in linear feet with the applicable depth of insulation and R-value. If the slab is not insulated and is considered part of the conditioned building envelope, the depth of insulation and R-value should be entered as zero.

For slabs with a top edge above finished grade or 12 inches or less below finished grade, the IRC requires the insulation R-value to be applied to the outside of the foundation or the inside of the foundation wall (the required R-value of insulation is dependent upon location of the project based on heating degree days). The insulation shall extend downward from the top of the slab, or downward to the bottom of the slab and then horizontally in either direction, up to a minimum distance of 4 feet (total depth of insulation is dependent upon location).

Therefore, a slab that is greater than 12" below grade would not need to be entered in *REScheck* and would not be required to meet slab insulation requirements.





Article #1458 -

## REScheck Webcast Questions - Crawlspace

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### For a house over a crawl space, what is entered for the area and how is insulation entered?

If the crawl space is vented to the outside, the crawl would be considered an unconditioned space and the floor above the crawl would be entered in *REScheck*. The floor area is calculated in total square footage and the insulation R-value should be entered under the Cavity Insulation column.

For a conditioned crawl space, which is insulated and mechanically ventilated, the floor above the conditioned crawl space would not be entered in *REScheck*. Instead, the crawl walls would be entered by calculating the height times the length of the crawl walls and entering the appropriate depth below grade, depth below outside grade, depth of insulation from the top of the crawl wall down to the footing, and insulation R-value.

The following link offers additional information on this subject:

[Does the Energy Code Allow an Unvented Crawlspace?](#)

### Is there any difference between the outside insulation with foam and inside with foam in crawl space insulation?

The code does not dictate whether to insulate the outside or inside of a conditioned crawl space. However, for the outside there is language requiring the rigid board insulation be protected (ie, flashing or cementitious scratch coat). *REScheck* treats the insulating value of both installation the same for crawl spaces.

### How do you enter cantilevered floor areas?

A cantilevered floor would be entered as a floor over outside air. This floor assembly can be chosen from the drop down list of assembly types under the floor component menu.

### What is more efficient for crawlspace insulation, under the floor or on the walls?

If the crawlspace is vented to the outside, then the floor should be insulated to save energy. Fiberglass is one option, but it should be installed so that it maintains contact with the floor above.



[Residential crawlspace construction. The vents indicated that this home will have a traditional \(vented\) crawlspace.](#)

Traditionally, crawlspaces have been vented to the outside. Now many building scientists think that the vents bring in more moisture than they remove in some locations, and it is better not to vent the crawlspace but to condition it. Code officials may be hesitant to accept this because they are often not familiar with this.

The following articles offer additional information:

- [To Vent or Not to Vent](#) 
- [Does the Energy Code Allow an Unvented Crawlspace?](#)
- [Details for Mechanically Vented Crawlspaces - Code Notes](#)

Last Modified: 2005-07-14

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Article #1450 -

## REScheck Webcast Questions - Energy Codes

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### How do I know if my area or state requires energy compliance?

DOE's Building Energy Codes website has the state energy code status for every state. Visit the [Status of State Energy Codes](#) web page, and click on the state in your area. The State page will display the state's applicable energy code and if our software tools are accepted for showing compliance.



### Is there any problem with enforcing the 2003 IRC while still enforcing the 2000 IECC?

Yes, the 2003 IRC references the 2003 IECC not the 2000 IECC.

### How do I know if I should use the prescriptive or tradeoff approach?

You should refer to the following articles for an overview of the differences between the energy code approaches.

- [Why are There So Many Approaches for Energy Code Compliance?](#)
- [About Residential Compliance](#)

### How do I know what code I need to meet?

If you are not sure what code is applicable for your project, visit the [Status of State Energy Codes](#) and choose the applicable state for the project.

### What if the location of the job site isn't listed in REScheck?

If your city is not listed in the drop down selection of cities, choose the closest city listed with the most similar weather data.

Article #1455 -

## **REScheck Webcast Questions - Garages**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### **Should a heated garage be included in the calculation? How about if the heater is only to maintain a temperature slightly above the outside temperature?**

If the garage has a peak design rate of energy usage less than 3.4 Btu/h per square foot or 1.0 watt per square foot of floor area for space conditioning purposes, the garage would not be considered part of the conditioned building envelope. If the garage is being heated by the system used for the home at a peak design rate greater than 3.4 Btu/h per square foot, unless the garage is zoned separately, the garage would be considered part of the conditioned building envelope. A separate system heating the garage would require determining the energy usage to determine whether the garage would be considered part of the building envelope.

### **Are spaces over garage areas considered conditioned areas? What about carports?**

If you have a room above a garage that is conditioned, the garage ceiling would be considered part of the conditioned building envelope (floor over unconditioned space) and would need to be insulated and sealed according to code.

Occupied living space over a carport would be required to meet the applicable energy code requirements for a conditioned space. The floor of the living space over the carport would be defined as a floor over outside air.

### **Are spaces over garage areas considered conditioned?**

If the space is heated and/or cooled the space would be considered a conditioned space.

Last Modified: 2005-07-14

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Article #1453 -

## **REScheck Webcast Questions - HVAC**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### **Do I get added credit for advanced HVAC systems such as ground source heatpumps?**

REScheck does not allow tradeoffs for ground source heat pumps, forced hot water, and some other systems in the Mechanical folder. The software does allow tradeoffs with air source heat pumps, fossil fuel furnaces, boilers, and air conditioners.

REScheck makes only the most common equipment types available for tradeoff (those types which are covered by Federal appliance standards and are rated with an AFUE, SEER, or HSPF). Other systems such as radiant floors, geothermal heat pumps, evaporative coolers, and others require complex calculations not available in REScheck. These systems can receive tradeoff credit only through a whole-house performance (i.e., Chapter 4) analysis.

The following links offer additional information on this subject:

- [Why is my Mechanical Equipment not Available in the REScheck Software?](#)
- [What Should I Do if my Mechanical Equipment is Not an Option in the REScheck Software?](#)

### **Does the compliance report tell you the heat loss of the building? What about cooling load?**

No, because infiltration, duct loss, internal gains, and solar gains are not used in calculating compliance.

The following link offers additional information on this subject:

[Does REScheck Take Air Infiltration into Consideration?](#)

### **Does the code require a high efficiency furnace? I noticed the example showed 78% efficiency.**

No, the code does not require a high efficiency furnace. The code does require the furnace meet the minimum efficiency mandated by NAECA which has a 78% efficiency rating.

### **How do you account for different mechanical equipment types such as split system, RTU etc?**

The efficiency tables in the energy code define both split, packaged, and other systems. For systems not shown in

the residential sections of the code, the code refers you to the commercial mechanical section.

## **Can we use lower R-values than required of duct insulation with higher SEER ratings?**

There is no tradeoff allowed for duct insulation, therefore, regardless of the SEER rating, the minimum amount of duct insulation dependent upon project location will be required.

## **If you have a 2 story home and you use a 90% efficient unit on the first floor and use an 80% on the 2nd floor, does REScheck calculate on both systems or does it use only one?**

You can enter multiple HVAC systems in REScheck, however, credit towards the building envelope will be taken from the least efficient unit entered in the Mechanical folder.

## **On a house with an unconditioned basement, can you trade a 90% furnace in the basement for insulation in the attic ceiling?**

REScheck does perform equipment efficiency tradeoffs towards the conditioned building envelope, regardless of where the HVAC is installed (unconditioned or conditioned basement). If the system has a higher rating than the minimum efficiencies shown in the code, the building envelope will receive credit towards compliance.

## **If you do not have heating and cooling vents in the basement and therefore "render" the basement unconditioned, must you then insulate the ducts?**

Yes, duct insulation would be required for ducts in unconditioned spaces. The minimum R-value of insulation on the ducts depends upon the location of your project based on heating degree days.

The following link offers additional information on this subject:

[Does the Energy Code Allow an Unvented Crawlspace?](#)

## **Does the residential pipe insulation requirement still apply when the pipes are on the inside of the conditioned building envelope?**

For automatic circulating hot water systems, insulation is required regardless of installation location. Minimum pipe insulation thickness is dependent upon the service water heating temperature and pipe size. Other piping in the conditioned space typically does not require insulation.

## **When is the minimum SEER rating going to change?**

The minimum SEER rating will change from a SEER 10 to SEER 13 in January 2006.

## **Is there an option for ducts located within conditioned space?**



[Floor and duct insulation.](#)



[Pipe insulation shown below the floor.](#)

Ducts located within a conditioned space would not be required to be insulated. There is not an option to input or show ducts within a conditioned space in RES*check*. The mandatory requirements for duct insulation, based upon location and the code, will be displayed in the Inspection Checklist.

There are other energy code requirements if ducts are located in conditioned spaces. Please refer to [Details for Mechanically Vented Crawlspace - Code Notes](#).

Last Modified: 2005-07-14

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Article #1449 -

## REScheck Webcast Questions - Log Walls

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### Is there anything special to enter in REScheck when using log structure wood walls?

REScheck has a drop down list of log walls to choose from. The log choices are based on nominal thickness in inches ranging from 5" to 16". If one of the log wall choices does not match your log wall assembly, you can choose "other" as your assembly type from the drop down list and enter the overall u-factor of the log wall.

### For log home packages do I take the R-value per inch of log times thickness? For instance cedar is 1.41 per inch x 5.5 = 7.75 R-value.

In REScheck the log wall choices in the drop down list assume a thermal resistance r-value per inch range of 1.1-1.3 plus 0.85 for film resistance. A wood density range of 1.7 lb/ft<sup>3</sup> at 12% moisture content for west coast wood and cedar to 41.2 lb/ft<sup>3</sup> for southern pine and a specific heat of 0.39 Btu/lb degree F at 12% moisture content. The log choices are based on nominal thickness in inches ranging from 5" to 16". If one of the log wall choices does not match your log wall assembly, you can choose "other" as your assembly type from the drop down list and enter the overall u-factor of the log wall.

### Why does REScheck not allow Mass Wall Credit for anything less than a 7 inch log wall?

The MEC and IECC include a mass wall credit for walls having a heat capacity greater than or equal to 6 Btu/ft<sup>2</sup> degree F. The code states that, "Solid wood walls having a mass greater than or equal to 20 lb/ft<sup>2</sup> have heat capacities equal to or exceeding 6 Btu/ft<sup>2</sup> degree F." According to the data in Table A.20 of the document titled, "[Methodology for Developing the REScheck Software through Version 3.6 \(pdf, 1.2 MB\)](#)", 5 inch and 6 inch log walls do not meet these criteria, with the heat capacity given just at the lower boundary but the weight falling below 20 lb/ft<sup>2</sup>.

We are currently working on updating the log wall assembly options in REScheck. The next release of REScheck will address the mass wall credit below a 7" log wall. Determination of the log mass wall credit will be based on the new consensus process in the ICC for log wall thermal calculations. The next release of the software is expected in September 2005. An email will be sent to all registered users.



Article #1460 -

## REScheck Webcast Questions - Overhangs and Orientation

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### Does a covered front porch count as an overhang if there is a second floor over porch?

Yes, any permanent extension counts as an overhang. In REScheck, you will need to separate out all of your walls and input the appropriate projection factor for each window or group of windows entered in the program. Keep in mind, this option is only available in REScheck for projects in an area of < 3500 heating degree days where the mandatory requirement for the solar heat gain coefficient of the windows is 0.40 and certain codes are selected in the Code menu.

### How do you calculate the U-value for projection of overhangs?

The value for the overhang is not considered a U-value. It is called a "projection factor" which can help with compliance in locations < 3500 heating degree days where the code is 1998 IECC, 2000 IECC, or 2003 IECC or in Pima, Arizona < 4000 ft or Georgia. The option exists to use orientation and enter any overhangs that exist on the project.

The projection factor enables you to characterize the shading impact of horizontal overhangs or canopies that project outward from the plane of the window. The projection factor is the ratio of the distance the overhang projects from the window surface to its height above the sill of the window it shades. Overhang Projection Factor = a (distance to edge of overhang)/b (distance to bottom of window sill).

The following link offers additional information on this subject:

[What is a Projection Factor?](#)

### I'm in Colorado, but I would like to enter Orientation and Projection Factor. How would I do this?

Orientation and Projection Factor are not available unless the project is in a location of < 3500 heating degree days and the code is 1998 IECC, 2000 IECC, or 2003 IECC or when Pima, Arizona < 4000 ft or Georgia. The reason these options are not available outside of the locations listed is that the program offers credit only towards a mandatory solar heat gain coefficient (SHGC) of .40.

### How do you handle orientation of angled walls?



The orientation option is only available in REScheck for projects in an area of < 3500 heating degree days where the mandatory requirement for the solar heat gain coefficient of the windows is .40. If this option is applicable to your project, select *Orientation* from the Options menu to enable the *Front Faces* drop list for the building and create the *Orientation* column for walls, windows, doors, and basement walls. For walls, use the *Orientation* column to select the wall's orientation relative to the front of the building. To orient the right and left side of the building visualize yourself inside the building facing the front. Any windows or doors entered belonging to a wall with a set orientation will have the same orientation as the parent wall.

*Front Faces* represents the angle of the front face of the building relative to North. If the building front faces North, the building orientation will be 0 degrees; if the building front faces East, this will be 90 degrees and so on. Select one of the eight cardinal points in the drop list or choose *Custom*. *Custom* allows the user to specify an angle (in degrees) by rotating the building using a diagram.

## Are south overhangs taken into account when calculating solar gain?

If you choose Orientation and Projection Overhangs from the Options menu, the software will take into account overhangs when calculating an adjustment towards the solar heat gain coefficient requirement. This option is only available if your project is in a location < 3500 heating degree days where the code is 1998 IECC, 2000 IECC, or 2003 IECC or in Pima, Arizona < 4000 ft or Georgia.

The adjustment to SHGC for overhang projections is based on work developed by the Technical Evaluation Committee for ASHRAE Special Project 53, under subcontract to PNNL in 1985-1988. The underlying data source was the ARES database. This work produced a set of multipliers specific to eight orientations along with a regression analysis based simplified formula. The relative orientation of the component with respect to "North" is first determined in order to select the correct set of coefficients to apply to the simplified multiplier formula. With the selected coefficients applied along with the glazing component projection factor, a multiplier results that can be applied to the component proposed SHGC. Note that projection factors do not apply to skylights. The multipliers and formula to be applied to the projection factor are:

$$\text{multiplier} = \exp(A * \text{atan}(\text{PF})) + \text{MO} - 1$$

where the multipliers MO and A vary by orientation as follows:

Orientation	MO	A
N	1.033182	-0.0908
NE/NW	1.121773	-0.4656
E/W	1.162932	-0.7521
SE/SW	1.232682	-1.0165
S	1.323909	-1.3817

The adjustment process will occur when a request for the building average adjusted SHGC is requested. The process will loop through all applicable glazing components and for each in turn, compute the projection factor multiplier then compute the adjusted area-weighted proposed SHGC and sum this into a running total that is then divided by the total fenestration area when all components have been processed.

## When should I consider orientation for my project?

If your project is in a location < 3500 heating degree days where the code is 1998 IECC, 2000 IECC, or 2003 IECC or in Pima, Arizona < 4000 ft or Georgia, the option exists to use orientation and enter any overhangs that exist in the project. This option should be considered if your project is not meeting the mandatory requirement of 0.40 SHGC on any windows or glass doors.

Last Modified: 2005-07-14

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Article #1456 -

## REScheck Webcast Questions - Roof and Ceiling

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

**Is there a distinction between roof area and ceiling area? Roof area is usually larger, but conditioned space only connects to attic through ceiling area, not roof.**

The ceiling area should be measured on the slope of the finished interior surface.


**What area do you use for a scissor truss, the foot print or the area insulated?**

The ceiling area should be measured on the slope of the finished interior surface.

**We use R-11 batts between the roof trusses and then blow in R-19 on top of that; can I show this as R-11 in cavity and the R-19 is continuous value?**

The total R-value should be entered as cavity. The software automatically calculates insulation that is assumed to be over the trusses and treat as continuous.

**How do you measure the bevel along the insulation, the lower or upper part of the angle?**

In the case of the ceiling, REScheck accounts for the bevel in the calculations and thus you would enter the full called out R-value of the insulation. For details on the calculations used, refer to our [Methodology for Developing the REScheck Software through Version 3.6](#) (pdf, 1.2 MB)  Document.

**On attic trusses, do you use wall insulation or roof insulation on the vertical part of the truss?**

Use roof insulation; the wall stops at the top plate.



[Residential roof construction.](#)

Article #1459 -

## **REScheck Webcast Questions - Slabs**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### **Is a heated slab "heated" or is it a slab in a conditioned space?**

The definition of a heated slab is a slab that is directly heated by using hydronic coils or other means within the slab itself.

### **Is slab edge insulation only for a walk-out situation?**

No, slab on grade floors, whether a walk-out or the entire house must meet insulation requirements dependent upon location of the project.

For slabs with a top edge above finished grade or 12 inches or less below finished grade, the IRC requires the insulation R-value to be applied to the outside of the foundation or the inside of the foundation wall (the required R-value of insulation is dependent upon location of the project based on heating degree days). The insulation shall extend downward from the top of the slab, or downward to the bottom of the slab and then horizontally in either direction, up to a minimum distance of 4 feet (total depth of insulation is dependent upon location).

### **In Texas I am not positive that it is necessary to insulate slab on grade. However if not necessary and need to get proper energy compliance can this be performed or does this need to be consulted with building inspectors?**

Most areas of Texas do not have slab on grade insulation requirements. However, even if the slab is not required to be insulated and the slab is part of the building envelope, it must be shown on the compliance report.

The following link offers additional information on this subject:

[Why is Perimeter Slab Insulation Important?](#)

### **For slabs with exterior rigid insulation with a kicked out wing; there is a joint that is sometimes not supported correctly; which often breaks when back filled thus breeching the continuous insulation.**

This is an application problem. The code wants to see the full R-value at the slab edge. Following this approach leaves you without a nailer for carpet tack strip. There is language in the code when slab insulation is installed between the exterior wall and the edge of the interior slab, the top edge of the insulation shall be permitted to be cut at a 45 degree (0.79 rad) angle away from the exterior wall. Insulation extending horizontally away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil. However, this does tend

to be a weak edge and often times can break.

## **Regarding slab on grade: how do you do the turned-up insulation if the slab actually sits on the foundation wall?**

You need to either provide a thermal break or insulate the outside edge of the slab or trade it off with another building envelope component.

Last Modified: 2005-07-14

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Article #1451 -

## **REScheck Webcast Questions - Software**

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### **Do REScheck Compliance Certificates need to be sealed or does a "licensed professional" need to certify and submit the compliance report to the building department?**

The energy code does not require that a certified design professional sign or seal residential compliance certificates.

### **Is it acceptable for the HVAC contractor to perform the REScheck reports for the building departments?**

Yes, it is acceptable for the HVAC contractor to perform the REScheck reports. The energy code does not require that a certified design professional sign residential compliance certificates.

### **Can a township require that an engineer and/or architect be the only one that can run REScheck and not the builder?**

The township/jurisdiction and building official have the final authority of what is required for submittal and permitting.

### **How do you update your REScheck with new codes if you are running the downloaded version?**

If you have registered on our website as a REScheck user, when a major release is posted on our website, we will send an email to all registered users informing them of the new release and features included in the new release.

### **When is REScheck updated?**

The software has one or two major updates a year. The next major release is September 2005. Reminders of new releases are emailed to all registered users. If you are not a registered user and would like to receive a reminder, register on the [Building Energy Codes Program](#) website.

### **What are the changes from last year and this year (REScheck)?**

The major changes in REScheck included incorporating compliance to the 2003 International Energy Conservation Code, Arkansas's State specific code, electronic on-line permitting capability, and several minor enhancements and bug fixes.

## How can I access REScheck Web?

You can click the link on the homepage of the [Building Energy Codes Program](#) website or go directly to the [REScheck-Web](#) software.

## If you choose "Code: 2003 IECC", but I am in a "drop down" state, will the program work?

Yes, the program will work, however, if your state is listed in the drop down Code Menu, the state most likely has a "state specific code" with special amendments and should be used instead of one of the national codes for compliance. For more information about the energy code in your state please refer to the [Status of State Energy Codes](#) database.

## Can a project be created in REScheck, then "imported" into REScheck-Web? Or vice versa?

Not at this time. This feature is planned for future releases of the software.

## Can you import project data from another analysis program (i.e Carrier, EliteSoft, Trane)?

REScheck does not have an option for importing data from other programs.

## I am interested in creating OUTPUT files from a CAD software. Are there any IMPORT avenues in REScheck? If so, what would that look like?

REScheck does not have an option for importing data. However you could save your project as a report by clicking on "Save Report" from the File Menu. Open the report in a text processor application on your desktop and resave the report with a \*.txt extension or a file extension that is compatible with your cad program. Try importing the saved file into your program after resaving it or try copy and paste.

The actual compliance certificate would be displayed on your cad drawings.

## What if the location of a job (city) is not listed in the pull down menu on the opening Project screen in REScheck?

If your city is not listed in the drop down selection of cities, choose the closest city listed with the most similar weather data.

## Is there a method for inserting a heading on secondary pages of the report, for example: project name, date of report, etc?

This is currently not a feature of the software. However, you could save your project as a report from the File menu in the program. Open the report in any text processor and manually enter the heading for the other pages of the report.

## Is there a link to the Resource Center in REScheck?

We are currently working on a future release of REScheck that will have the capability of retrieving above code and other code information from the Resource Center. This enhancement to the software should be completed



and released by September.

**I work with two and three story retirement residences; 100,000 square feet, 115 units that are both R-occupancy and A occupancy; do I use REScheck or COMcheck?**

Multifamily buildings that are three stories or less in height and have three or more attached dwelling units would fall under the residential energy code requirements and REScheck could be used to show compliance depending upon the adopted energy code within your location. Multifamily buildings greater than three stories in height would fall under the commercial energy code requirements and COMcheck-EZ could be used to show compliance.



[Multifamily building less than three stories in height.](#)

Multifamily buildings that are three stories or less in height and have three or more attached dwelling units would fall under the residential energy code requirements and REScheck could be used to show compliance depending upon the adopted energy code within your location. Multifamily buildings greater than three stories in height would fall under the commercial energy code requirements and COMcheck-EZ could be used to show compliance.

**When the Package Generator prints a compliance report, why are the areas not shown, which are useful for plan checking and to aid seeing if design is in compliance? The wall/ ceiling areas print out of REScheck and have been valuable.**

The REScheck Package Generator is based on the prescriptive packages in the energy code. The prescriptive requirements are not dependent upon the square footage of the components. The packages are primarily based upon the code, location of the project (climate zone) and the percentage of glazing.

**We haven't been able to print or view the How to Guide on the web site. It just locks up our computer.**

The Software User's Guide is a large file and might take awhile to open. The guide is also embedded within the help section of the desktop REScheck software as well as REScheck-Web. It might be easier to access the guide through one of the applications if you continue to have difficulty opening the guide on its own.

**Is there a way to attach a window schedule from the area take off tool to the compliance report or a way to save it as a text file?**

In Areacalc you can save your window schedule and print the schedule from within Areacalc. The window schedule cannot be saved as a text file.

**You have mentioned ENERGY STAR rating several times. Is there a way to show ENERGY STAR Rating with REScheck?**

There is not a way to show an ENERGY STAR rating with REScheck. However, it can be used for the initial step to achieving an ENERGY STAR rating, if the compliance results of your project achieve the baseline % better than code required by ENERGY STAR.

**Does the window/wall ratio shown on the compliance report include glass doors?**

Yes, the window/wall ratio includes doors that have more than 50% glass.

## **What is the category for vinyl-clad wood frame windows, vinyl? wood? other?**

Choosing "other" as the window assembly will allow the editing of the word "other" as the assembly description by double clicking in the assembly field and changing the name to vinyl-clad wood frame. You will also need to provide an appropriate U-value for the assembly.

## **What if geothermal heating is being used in my project, can I enter this in the mechanical tab?**

REScheck does not allow tradeoffs for ground source heat pumps, forced hot water, and some other systems in the Mechanical folder. The software does allow tradeoffs with air source heat pumps, fossil fuel furnaces, boilers, and air conditioners.

REScheck makes only the most common equipment types available for tradeoff (those types which are covered by Federal appliance standards and are rated with an AFUE, SEER, or HSPF). Other systems such as radiant floors, geothermal heat pumps, evaporative coolers, and others require complex calculations not available in REScheck. These systems can receive tradeoff credit only through a whole-house performance (i.e., Chapter 4) analysis.

## **What is the difference between REScheck and REScheck-Web?**

REScheck-Web requires no download or installation and you can save your projects online. There is no difference in the software calculation.

## **Can you import REScheck files into CAD?**

REScheck does not have an option for importing data. However, you could save your project as a report by clicking on "Save Report" from the File Menu. Open the report in a text processor on your desktop and resave the report with a \*\*.txt extension or a file extension that is compatible with your CAD program. Try importing the saved file into your program after resaving it or try copy and paste.

Article #1461 -

## REScheck Webcast Questions - Sunrooms and Additions

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### Does sunroom criteria apply to New York state code?

Yes, the sunroom requirements became effective in the 2001 IECC which NY has adopted. Therefore, if the addition meets the criteria defined in the code as a sunroom, the alternative prescriptive table can be used to show compliance. For more information on sunrooms, the latest issue of [Setting the Standard Newsletter](#) included an article on Special Code Requirements for Sunrooms and additions.



[The energy code has special requirements for sunroom additions.](#)

### What if you have a project where you are constructing an addition to a house and a new roof on the old house what do you do?

First suggestion would be to show compliance to the addition separately. This would include the square footage of the new roof that only defines the addition area.

Second suggestion would be to show compliance for the roof as an individual component. Your location and heating degree days (HDD) will define the minimum amount of insulation that would be required in the new roof construction. For this approach, the IECC references several figures dependent upon the assembly component; again the HDD will determine the minimum U-factor of the roof assembly. For additional help on determining compliance to the roof assembly, please feel free to contact tech support at [techsupport@becp.pnl.gov](mailto:techsupport@becp.pnl.gov).

Third suggestion, if you cannot get the addition by itself to meet code (which is not uncommon due to the fact that the window wall ratio is only based upon the new two to three exterior walls of the addition that can be shown for compliance), try to show compliance for the entire house including the new addition. The new roof upgrade with the required amount of insulation might get you into compliance. For this approach, I would suggest using REScheck to run your take offs that define the building envelope.

The following link offers additional information on this subject:

[Entering an Addition in the REScheck Software](#)

### Does a sunroom's perimeter get calculated into the exterior wall square footage of the building if the IECC tables are going to be used?

The prescriptive envelope component criteria in the 2003 International Energy Conservation Code (IECC) is an alternative compliance path for sunrooms and additions to existing residential buildings and structures.

The Solar Heat Gain Coefficient (SHGC) measures how well a window blocks heat from sunlight. The SHGC is the fraction of the heat from the sun that enters through a window. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits.

Sunrooms and/or additions that meet the criteria defined in the 2003 IECC can show compliance by using the Prescriptive Envelope Component Criteria table below for the designated heating degree days (HDD) applicable to the location.

**TABLE 1 2003 IECC/Sunrooms (Section 502.2.5)**

<b>HDD (heating degree day)</b>	<b>Fenestration U-factor (MAX)</b>	<b>Ceiling R-value (MIN)</b>	<b>Wall R- value (MIN)</b>	<b>Floor R- value (MIN)</b>	<b>Basement wall R- value (MIN)</b>	<b>Slab perimeter R-value and depth (MIN)</b>	<b>Crawl space wall R- value (MIN)</b>
0 - 1,999	.75	R-19	R-13	R-11	R-5	R-0	R-5
2,000 - 3,999	.50	R-19	R-13	R-19	R-8	R-5, 2 ft.	R-10
4,000 - 5,999	.50	R-19	R-13	R-21	R-10	R-9, 2 ft.	R-19
6,000 - 8,499	.50	R-24	R-13	R-21	R-11	R-13, 4 ft.	R-20
8,500 - 12,999	.50	R-24	R-13	R-21	R-19	R-18, 4 ft.	R-20

Solar Heat Gain Coefficient (SHGC) of .40 mandatory for locations < 3,500 HDD

**TABLE 2 2003 IECC/Additions (Section 502.2.5)**

<b>HDD (heating degree day)</b>	<b>Fenestration U-factor (MAX)</b>	<b>Ceiling R-value (MIN)</b>	<b>Wall R- value (MIN)</b>	<b>Floor R- value (MIN)</b>	<b>Basement wall R- value (MIN)</b>	<b>Slab perimeter R-value and depth (MIN)</b>	<b>Crawl space wall R- value (MIN)</b>
0 - 1,999	.75	R-26	R-13	R-11	R-5	R-0	R-5
2,000 - 3,999	.50	R-30	R-13	R-19	R-8	R-5, 2 ft.	R-10
4,000 - 5,999	.40	R-38	R-18	R-21	R-10	R-9, 2 ft.	R-19
6,000 - 8,499	.35	R-49	R-21	R-21	R-11	R-13, 4 ft.	R-20
8,500 - 12,999	.35	R-49	R-21	R-21	R-19	R-18, 4 ft.	R-20

SHGC of .40 mandatory for locations < 3,500 HDD

The suite of RES*check* software tools cannot be used to show compliance using the prescriptive criteria alternative compliance defined for sunrooms and additions in the 2003 IECC. Compliance can be shown on your building plans by verifying the criteria and minimum component insulation and maximum u-factor for fenestration have been met. Attaching the applicable table and reference to your building plans can also be used for documentation.

## **Does RES*check* accommodate values for isocyanurate installations?**

The R-value for isocyanurate insulation is entered in RES*check* in the same manner as other insulation material.

## **When do existing buildings need to be brought up to code?**

Existing buildings are not required to be brought up to code unless the exterior building envelope or any energy related parts or portions are being changed (such as window replacements, roof replacement, additions, lighting, service water heating, and HVAC systems).

## **In an addition, would I enter all of the walls including the shared wall with the existing part of the house?**

Insulation and energy code requirements for additions are for the new exterior walls only. The common wall between the existing and new addition would be considered a wall between two conditioned spaces and therefore should not be included in your compliance reporting.

Refer to [Energy Code Requirements for Sunrooms and Additions](#) for more information.

Last Modified: 2005-07-14

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Article #1452 -

## REScheck Webcast Questions - Walls

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

### For horizontal areas and linear lengths in wall areas, do you use the interior dimension or measure to the exterior face?

The area of the wall should be measured on the exterior face from the top of the floor to the bottom of the roof. The portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater is considered a wall.

### How do you enter unusual wall types in REScheck? Examples: Envelope - straw bale, adobe, rammed earth, SIPs.

For assembly types that do not fit into any of the assemblies shown in the drop down list in REScheck, the user can choose "Other" as the assembly. If you use "Other" as the assembly type, you must enter an overall U-factor for the entire assembly (including air films). Be prepared to provide the building department with manufacturers' literature or documentation of U-factor calculations.

### What if the R-value of the insulation at the rim joist is different than the value in the wall?

Input the total square footage of the rim joist area as a separate wall entry. You can also edit the component definition by double clicking on the word "wall" in the component column and change it to "rim joist".



[SIPs panels](#)

### Can I calculate all of the walls in a two story home and then enter my windows under one wall section? Does this affect the compliance or should the first floor windows be entered under the first floor wall and the 2nd floor windows under the 2nd floor wall?

If the walls are all the same construction and are all above grade, you can add all the walls together and show all of your windows under the one wall entry in REScheck. If you have different u-factors for any windows or doors, you should enter those components separately under the wall entry.

### Should the area of windows and doors be taken out of the area of the walls?

No, enter the total gross area of the wall component in the *Gross Area* field. No, enter the total gross area of the wall component in the Gross Area field. The gross wall area includes the area of all windows and doors within the


wall.

RES*check* automatically deducts the windows and any glass doors from the total square footage of the walls and will display the window wall ratio on the compliance certificate.

## **Does the flange on the exterior wall insulation need to be fastened over the studs to form a continuous vapor barrier?**

The IECC does not define how the insulation shall be fastened, however, there are several articles and videos explaining the proper technique for fastening the insulation to the studs. For batt insulation with flanges, the optimal technique is to fasten the flange to the face of the stud. Fastening the flange to the face of the stud allows for the full depth of insulation to be maintained as well as providing a continuous vapor barrier.

The following links offer information on this subject:

- [DOE Factsheet: Wall Insulation](#) (pdf, 765 KB) 
- [The Importance of Vapor Retarders](#)

## **If we have a brick veneered wall over a framed wall should we consider the R-value of the continuous air cavity between brick and frame wall as part of the wall?**

The standard wall types available in the pull down menus include typical construction U-factors. The assemblies in RES*check* (except the assembly called "other") have assumed U-factors for the entire assembly except for the insulation value. For example, a wood frame wall will include the R-value of interior and exterior air films, plywood siding, sheathing, and wood studs. If you choose "other" as your assembly type, you must enter the entire U-factor of the assembly and be prepared to provide the backup specifications to the building official as to how the U-factor was derived.

## **Are the R-values for joists, studs, etc. included or is that a number you type in the "continuous" column? If they are already included, what is the "continuous" column used for?**

The assemblies in RES*check* (except the assembly called "other") have assumed U-factors for the entire assembly except for the insulation value. For example, a wood frame wall will include the R-value of interior and exterior air films, plywood siding, sheathing, and wood studs. If you choose "other" as your assembly type, you must enter the entire U-factor of the assembly and be prepared to provide the backup specifications to the building official as to how the U-factor was derived.

The Continuous Column in RES*check* is used for insulation installed continuously over structural members and is typically rigid foam board or insulated sheathing.

### **Continuous Insulation (CI)**

Insulation that runs continuously over structural members and is free of significant thermal bridging; such as rigid foam insulation above the ceiling deck. It is installed on the interior, exterior, or is integral to any opaque surface of the building envelope.

The following link offers additional information on this subject:

[Insulation Overview](#)

## Does the type of exterior sheathing need to be noted or play any role?

If no insulated sheathing is entered (entered in the software as continuous insulation), the sheathing is assumed to be plywood with an R-value of 0.83. If insulated sheathing is used, only 80% of the net wall is assumed to be covered by the insulating sheathing. The other 20% is assumed to be covered with plywood (R-value = 0.83).

If you choose "other" as the assembly type, you must enter the U-factor of the entire assembly and be prepared to provide the backup specifications to the building official as to how the U-factor was derived.

## If you add thermal sheathing do you enter this to the continuous insulation next to the cavity selection?

Yes, you would enter the value in the continuous insulation column. Keep in mind, the assemblies listed in REScheck already have a default value added for standard sheathing (depending on the assembly component). If no sheathing is indicated by the user, the sheathing is assumed to be plywood with an R-value of 0.83. If insulating sheathing is used, only 80% of the net wall is assumed to be covered by the insulating sheathing. The other 20% is assumed to be covered with plywood.



## How can I get an R-value of 21 in a 2x4 cavity exterior wall?

The following three systems are equal to achieve an approximate R-21:

1. use 2x4 wall with R-11 batt and R-7 rigid board insulation
2. use 2x4 wall with R-13 batt and R-6 rigid board insulation
3. use 2x4 wall with R-15 batt and R-5 rigid board insulation

The following link offers additional information on this subject:

[Insulation Options](#)

## Can one use cavity insulation in conjunction with continuous on ceiling and or walls?

Yes, insulation to be installed between furring or studs is entered in the Cavity R-Value column. If the installed wall insulation will be continuous (such as with exterior rigid insulation or interior "draped" insulation), the insulation R-value is entered in the Continuous R-Value column. A combination of insulation systems may be used. For example, installing R-13 batt insulation between the studs and R-5 rigid insulation on the exterior of the stud wall.


Cavity insulation is insulation installed in the cavities between structural members, such as wood studs, metal framing, and Z-clips. Continuous insulation runs continuously over structural members and is typically rigid foam board. Cavity insulation is affected by thermal bridging, while continuous insulation reduces thermal bridges.




## Does REScheck take thermal mass into account?

REScheck does not perform load calculations; it computes an overall UA (u-factor x area) of the envelope components.

In most locations, the code allows walls having a heat capacity greater than or equal to 6 Btu/ft<sup>2</sup> °F to have a higher Uo factor than low-mass wood- or metal-frame walls (see Tables 502.1.2a-502.1.2c of the MEC; Tables 502.1.1(1)-502.1.1(3) of the 1998 IECC; and Tables 502.2.1.1.2(1)-502.2.1.1.2(3) of the 2000 and 2003 IECC). Masonry or concrete walls weighing at least 30 lb/ft<sup>2</sup> and solid-wood walls weighing at least 20 lb/ft<sup>2</sup> are eligible for this credit (the area to be considered is the exterior surface area of the mass wall). In the software, eligible mass wall components receive this credit as an increase in the code building UA (the mass wall required Uo factor is greater than the low-mass wall required Uo factor). Brick veneers or log walls constructed of logs less than 7 in. thick currently do not receive this credit.

The Uo factor for all mass walls except log walls is based on the R value of the insulation, the type of mass wall (solid concrete or block masonry), and the location of the insulation (exterior or interior). For log walls, the Uo factor is based on the thickness of the logs plus any additional insulation that might be used. (The area considered is the exterior surface area of the mass wall.) Section A.2.3 in Appendix A describes the computation for determining mass wall Uo factors. Refer to the document titled, "[Methodology for Developing the REScheck Software through Version 3.6](#) (pdf, 1.2 MB) .

**In a structure that has a brick ledge, when using rigid exterior insulation there is a transition area from where the brick ledge starts to the rim joist. How do you insulate this area? An example -- if I am using an R-10 2" Dow Board I do not have enough room behind the brick to continue the insulation.**

The Cavitymate page of the [Dow Chemical Company](#)  website has several diagrams with different installation techniques with Styrofoam.

## Are there situations where you might enter both cavity and continuous insulation?

Yes. Insulation to be installed between furring or studs is entered in the Cavity R-Value column. If the installed wall insulation will be continuous (such as with exterior rigid insulation or interior "draped" insulation), the insulation R-value is entered in the Continuous R-Value column. A combination of insulation systems may be used, for example, installing R-13 batt insulation between the studs and R-5 rigid insulation on the exterior of the stud wall.

## Do I need to include rim joists and knee walls?

Yes, both components should be entered and insulated. See following article for additional information:

[Rigid Board Insulation Installed as Draft Stop in Attic Kneewall - Code Notes](#)

## How do I enter a wall type that is not listed in REScheck?

You can choose "other" as your assembly type from the drop down list. You must also enter the U-factor of the entire assembly and be prepared to provide the backup specifications to the building official as to how the U-factor was derived.

## What is the difference between cavity and continuous insulation?

Cavity insulation is insulation installed in the cavities between structural members, such as wood studs, metal framing, and Z-clips. Continuous insulation runs continuously over structural members and is typically rigid foam board. Cavity insulation is affected by thermal bridging, while continuous insulation reduces thermal bridges. The Continuous Insulation Column in RES*check* is used for insulation installed continuously over structural members and is typically rigid foam board or insulated sheathing.

Last Modified: 2005-07-14

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Article #1466 -

## REScheck Webcast Questions - Windows

This article is based on questions asked during both the May 6, 2005 [REScheck Training Webcast](#) and the July 28, 2005 [REScheck Training Rebroadcast](#) as well as questions received through email following these events. The original language of the questions and answers has been modified to make them as generic as possible while retaining the applicable specific information.

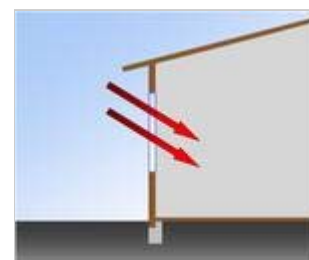
### What if windows aren't chosen at time of REScheck forms being completed? Can we state a SHGC and show on front sheet under notes as being the maximum when actually chosen?

The code requires the U-factor of any glazing be from the NFRC label of the manufactured product or the default tables for maximum U-factors and SHGC must be used. The SHGC default values in the code do not meet the .40 SHGC mandatory requirement for locations with < 3500 heating degree days. Therefore, locations in areas needing to meet the mandatory .40 SHGC will need to either choose windows that will meet code prior to completing compliance or get approval from the code official if using values that are not from the default table or manufacturer label.

The following link offers additional information on this subject:

[How Do I Demonstrate Compliance with the SHGC Requirements in the IECC?](#)

[The Importance of Vapor Retarders](#)



**Solar heat gain coefficient (SHGC)** The SHGC is the fraction of incident solar radiation admitted through a window.

### Does the software account for air infiltration values for windows?

No, the software does not account for air infiltration values for windows.

### Do I have to enter each window individually or one lump area amount?

If all the windows have the same U-factor and assembly characteristics, the user can enter the total area of all windows as one item. Keep in mind, if more than one wall is entered in the program, any windows and doors that are part of the individual walls should be entered under their respective walls.

### For windows, do I specify casement, picture, or double hung?

No, you only need to enter the assembly type, calculate the rough opening area of your glazing, and input the U-factor from the manufacturer label.

### What is a thermal break in a metal frame window?

The most common solution to the heat conduction problem of aluminum frames is to provide a thermal break by

splitting the frame components into interior and exterior pieces and using a less conductive material to join them. Current technology with standard thermal breaks has decreased aluminum frame U-factors (heat loss rate) from roughly 2.0 to about 1.0 Btu/hr-sq. ft-°F.

Last Modified: 2005-07-29

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